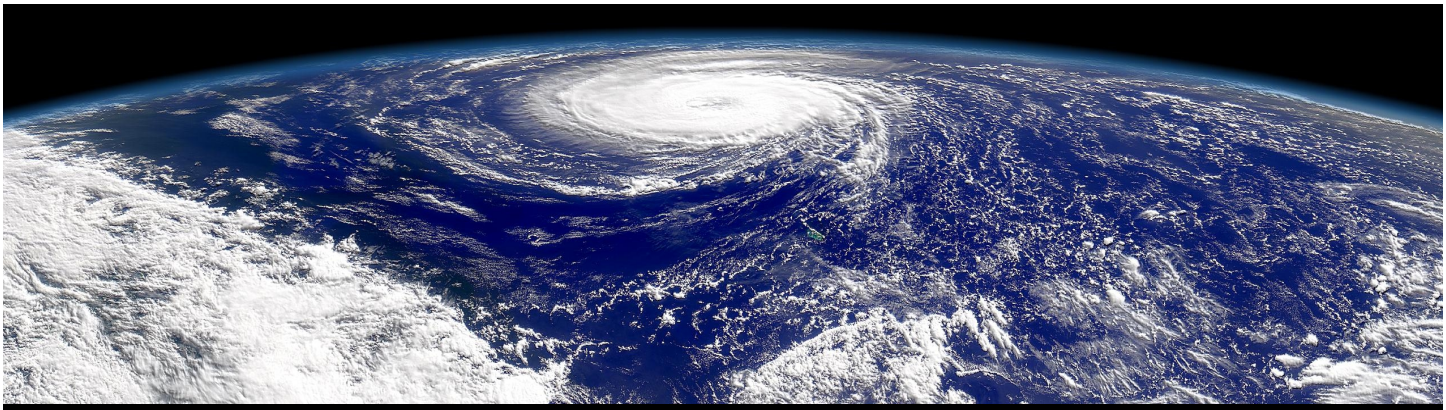

REMOTE SENSING OF THE ATMOSPHERE AND OCEANS

EAS 8803

Spring 2005

Meeting Time: Tuesdays: 3:05-4:25 PM L1175
Thursdays: 3:05-4:25 PM Computer Room, L1110

Instructor: Prof. Irina N. Sokolik office 2258, phone 404-894-6180
isokolik@eas.gatech.edu

Description: **This course provides a foundation for understanding the physical principles of remote sensing of the atmosphere and oceans. The course is designed as a collection of lectures and computer modeling laboratories. The lectures focus on the fundamentals of the interactions between electromagnetic radiation and atmospheric gases, aerosols and clouds, and ocean surfaces, covering the spectrum from the ultraviolet through the microwave. The labs provide hands-on experience in using remote sensing data for various applications in atmospheric and oceanic sciences. Topics to be covered include aerosol and cloud property retrievals, ozone and air pollution characterization, vertical temperature and humidity profile retrievals, sea ice characterization, and retrievals of ocean color and sea surface temperature. The main goal of the course is to provide a broad conceptual framework for physical understanding the methodology and applications of remote sensing.**

Required Text: ***Remote Sensing of the Lower Atmosphere: An Introduction.***
G.Stephens. Oxford Univ. Press 1994.

Course Website: http://irina.eas.gatech.edu/EAS8803_2005.htm

REMOTE SENSING OF THE ATMOSPHERE AND OCEANS

Outline

1. Basics of remote sensing: introductory survey
2. The nature of electromagnetic radiation:
   Polarization. Stokes' parameters.
   Radiation law. Blackbody emission. Brightness temperature.
3. Emission and reflection from the ocean and land surfaces
4. The composition and structure of the atmosphere. Properties of atmospheric gases, aerosols and clouds.
5. Absorption/emission by atmospheric gases and effects on remote sensing.
6. Scattering/absorption by aerosols and clouds and effects on remote sensing.
7. Principles of passive remote sensing using extinction and scattering. Scattering as a source of radiation. Multiple scattering.
8. Applications of passive remote sensing using extinction and scattering:
   Sensing of ozone in the UV region
   Ocean color
   Sensing of clouds and aerosols (retrieval of optical depth and particle sizes)
9. Principles of passive remote sensing using emission. Radiative transfer with emission.
10. Applications of passive remote sensing using emission:
    Sensing of sea surface temperature (SST)
    Sensing of precipitation
    Sensing of clouds
11. Principles of sounding by emission:
    Sounding of the temperature profile
    Sounding of trace gases and air pollution
12. Principles of active remote sensing: Radars and lidars
13. Applications of radars:
    Sensing of clouds and precipitation
14. Applications of lidars:
    Sensing of water vapor and trace gases
    Sensing of aerosols and clouds